entered into a weak phase of its activity. Details of delay in monsoon advancement during 2009 over North India are given below:—

Sl. No.	Name of the sub-division	Normal date of monsoon onset	Actual date of monsoon onset during 2009	No. of days of delay
1.	Jharkhand	16th June	29th June	14
2.	Bihar	16th June	29th June	14
3.	Chhattisgarh	17th June	26th June	10
4.	East Madhya Pradesh	20th June	29th June	10
5.	Gujarat Region	21st June	24th June	4
6.	East Uttar Pradesh	22nd June	29th June	8
7.	Saurashtra, Kutch and Diu	22nd June	24th June	3
8.	Uttarakhand	26th June	29th June	3

On the whole, Monsoon-2009 advancement over parts of north India is found to be 3-14 days delayed from the respective normal date of onset in various parts of the country. It is believed that the realized delay of monsoon onset does not have appreciable impact on the sowing operations in those parts of the country.

(c) The India Meteorological Department (IMD) is keeping a continuous watch on the monsoon rainfall activity on day-to-day basis and provides updates to various Ministries of Government of India (Agriculture; Water Resources etc.) for taking appropriate steps to deal with the emerging situation effectively.

Problem of climate change

1368. DR. K. MALAISAMY: Will the Minister of EARTH SCIENCES be pleased to state:

(a) to what extent India has succeeded or is hopeful of succeeding over the problem of climate changes;

(b) in case, of inaction, or non-action or less action in dealing with this major threat, what would be its repercussions; and

(c) whether India has resorted to the assistance of expert study either from within or abroad?

THE MINISTER OF STATE OF THE MINISTRY OF EARTH SCIENCES (SHRI PRITHVIRAJ CHAVAN): (a) and (b) The causal factors and consequently action for mitigating possible climate change and global warming, are mainly focused on reduction of carbon emissions. Norms for carbon emission limits are in place for industry, power sector, automobiles etc. India and the world are committed to addressing the critical problem of stabilizing carbon emissions.

(c) The impacts of climate change on various sectors like agriculture water resources, biodiversity, human health, coastal ecosystems and forestry are well documented under the India's first National Communication (NATCOM) to the United Nations Framework Convention on climate Change (UNFCCC). The second NATCOM report is under preparation. These efforts are coordinated by Ministry of Environment and Forests. More than 2 dozen leading research teams are involved with this endeavour.

Climate change

1369. DR. K. MALAISAMY: Will the Minister of EARTH SCIENCES be pleased to state:

(a) while global warming and corresponding climate changes will have complex problems and distinctive dimensions, what are the essential measures and means for mitigation of this major problem;

(b) what can be its impact on agriculture, water resources, sea levels, coastal safety, Bio-diversity, climate and health; and

(c) India's response to climate changes challenges?

THE MINISTER OF STATE OF THE MINISTRY OF EARTH SCIENCES (SHRI PRITHVIRAJ CHAVAN): (a) The global community, world over, has agreed for evolving the essential measures for mitigation of global warming impacts, which include reduction of carbon emissions, greater use of renewable/nuclear energy, preservation of Ozone Layer, preservation of ecological systems, deployment of eco-friendly technologies etc.

(b) Possible impacts on Agriculture: Variable impacts of climate on agriculture have been projected. For instance, increase in CO_2 concentration; increase in temperature and variable distribution of rainfall show a mixed projection of yields of various crops across regions. No definite trends have yet been established.

Possible impact on Water Resources: It is projected that quantity of surface run off due to climate change would vary across the river basins as well as sub basins of major rivers. However, there is a general reduction in the quantity of the available run off.

Possible impact on sea levels and coastal safety: Analysis of past tide gauge records for the Indian coastline regions gives an estimate of sea level rise of 1.30 mm/year. It is projected that Indian coastline may experience higher sea level rise in the later part of 21st century. Such a scenario can possibly increase the vulnerability of the coastal zones.

Possible impact on Bio-diversity; The emerging results of analysis of impacts of climate change on forest biomes in India seem to be highly vulnerable to the projected change in climate. Majority of the vegetation in India is likely to be less optimally adapted to its existing location and consequently vulnerable to the adverse climatic changes. Biodiversity is also likely to be adversely impacted due to this.